

How to train a model?

Machine Learning in the web

Bruce Munro "Field of Light"

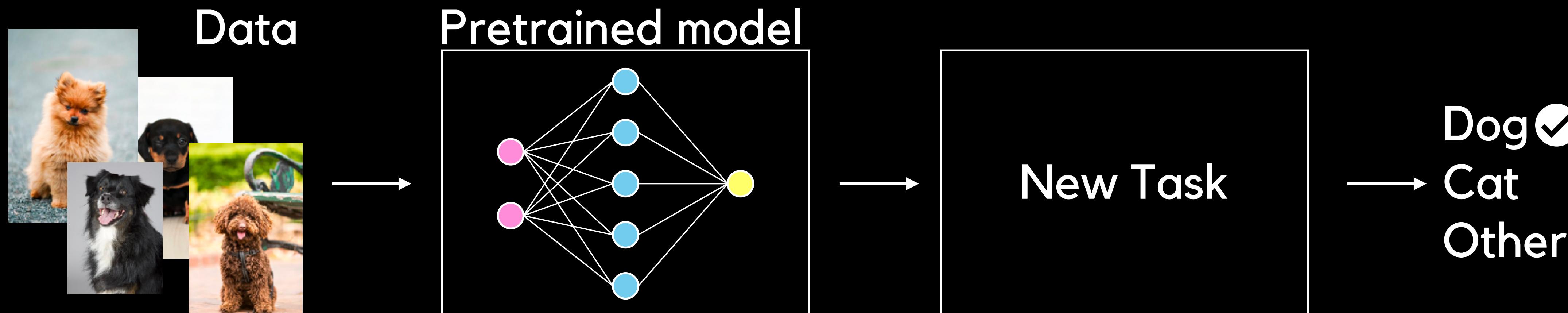
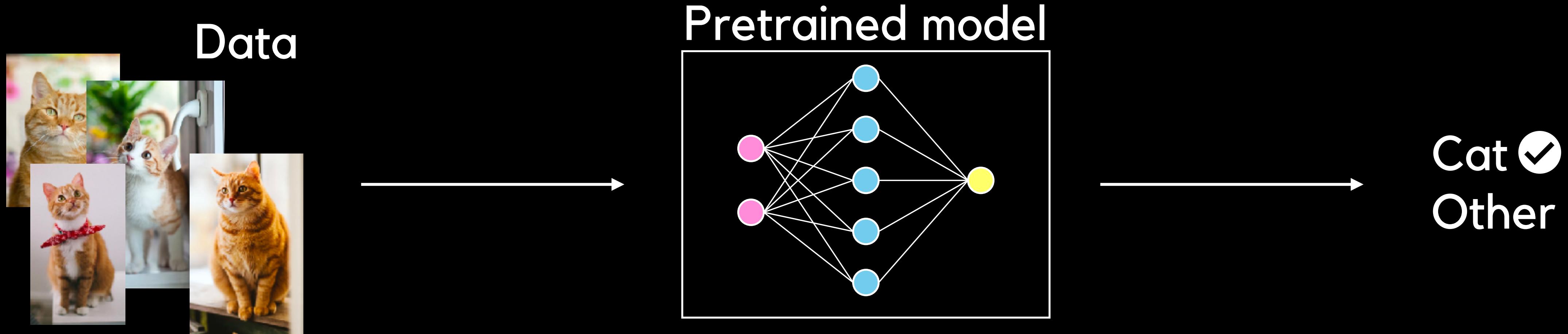
Machine Learning needs a lot of
GPU Compute.

Machine learning needs mostly a lot of GPU compute, but it can also be optimized to run efficiently in environments with limited resources.

Transfer learning

Instead of training models from scratch you can use transfer learning, where a pre-trained model is fine-tuned with a smaller dataset.

Transfer learning

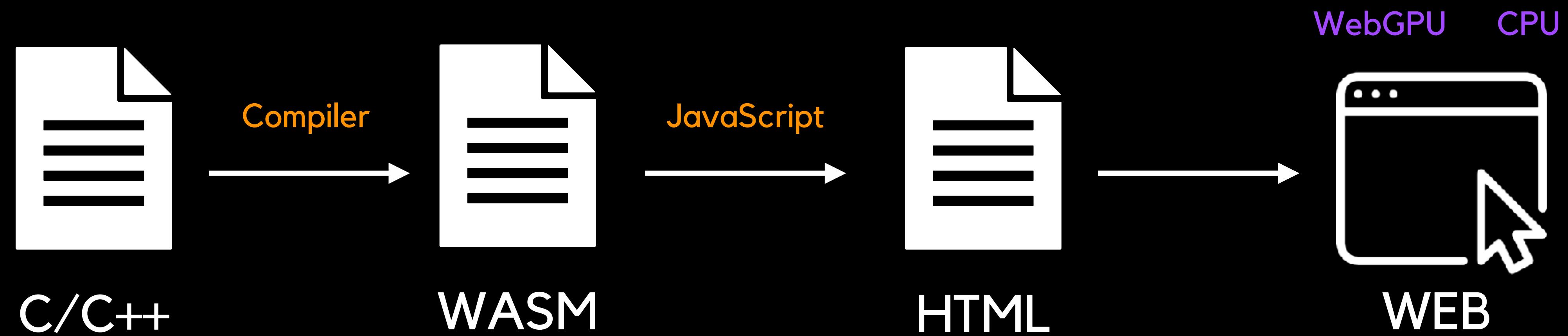


Libraries

Libraries like TensorFlow.js allow developers to run pre-trained models directly in the browser and even perform training on smaller models using the GPU acceleration available in most modern browsers

Web Assembly (WASM)

WebAssembly allows code written in languages like C or C++ to run in the browser at near-native speed. Some machine learning libraries are being compiled to WebAssembly, enabling more efficient execution of complex computations



Tensorflow.js

- training and deploying machine learning models on web applications
- easy to use API integration
- recently taken over by pyTorch, but still used for automation

MediaPipe

- cross-platform, customizable ML solutions for live media
- allows tailoring models for solutions with specific data
- optimized for on-device machine learning

Solutions

Solution	Android	Web	Python	iOS	Customize model
LLM Inference API	●	●		●	●
Object detection	●	●	●	●	●
Image classification	●	●	●	●	●
Image segmentation	●	●	●		
Interactive segmentation	●	●	●		
Hand landmark detection	●	●	●	●	
Gesture recognition	●	●	●	●	●
Image embedding	●	●	●		
Face detection	●	●	●	●	
Face landmark detection	●	●	●		
Face stylization	●	●	●		●
Pose landmark detection	●	●	●		
Image generation	●				●
Text classification	●	●	●	●	●
Text embedding	●	●	●		
Language detector	●	●	●		
Audio classification	●	●	●		

ml5.js

- simplified interface to implement ML algorithms in web applications
- includes pre-trained models (image classification, body/face estimation, etc.)
- suitable for creative coding projects that require live interaction
- works well with other JavaScript libraries and frameworks e.x. p5.js

Models (ml5.js 0.2.0)

BodyPose



BodySegmentation



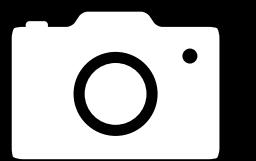
HandPose



FaceMesh



ImageClassifier

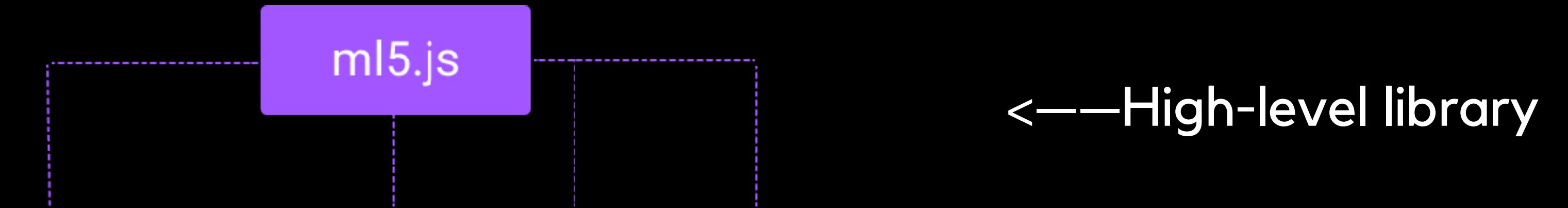


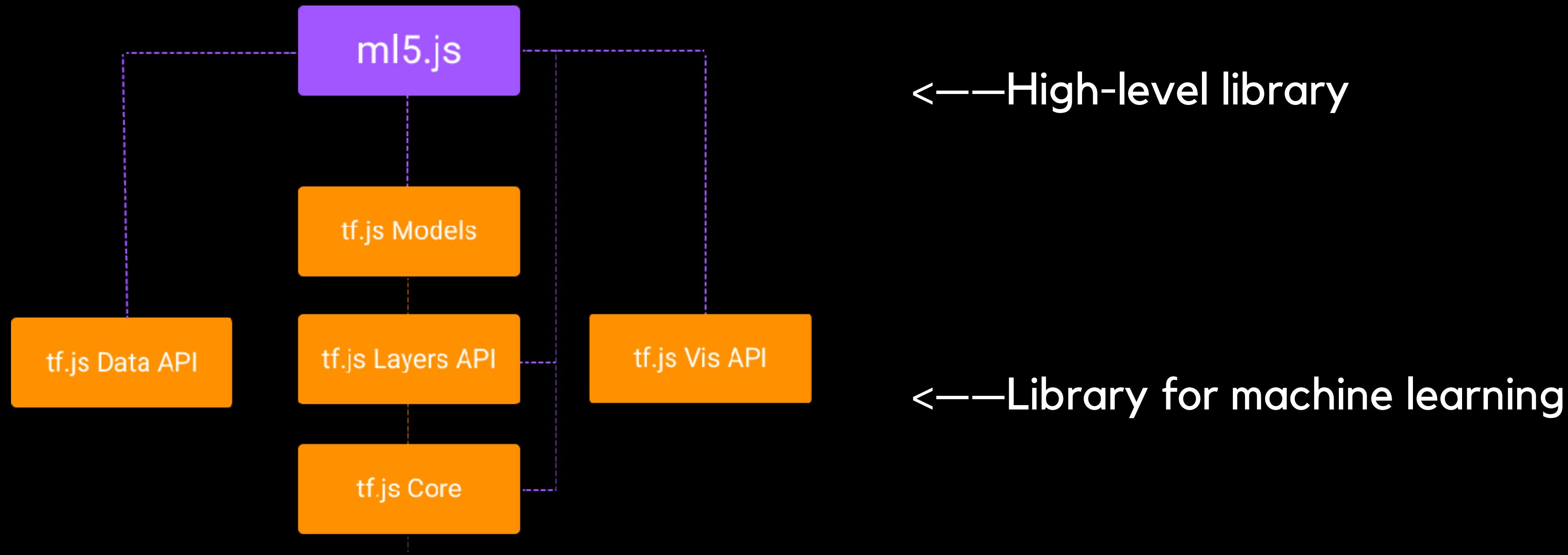
SoundClassifier

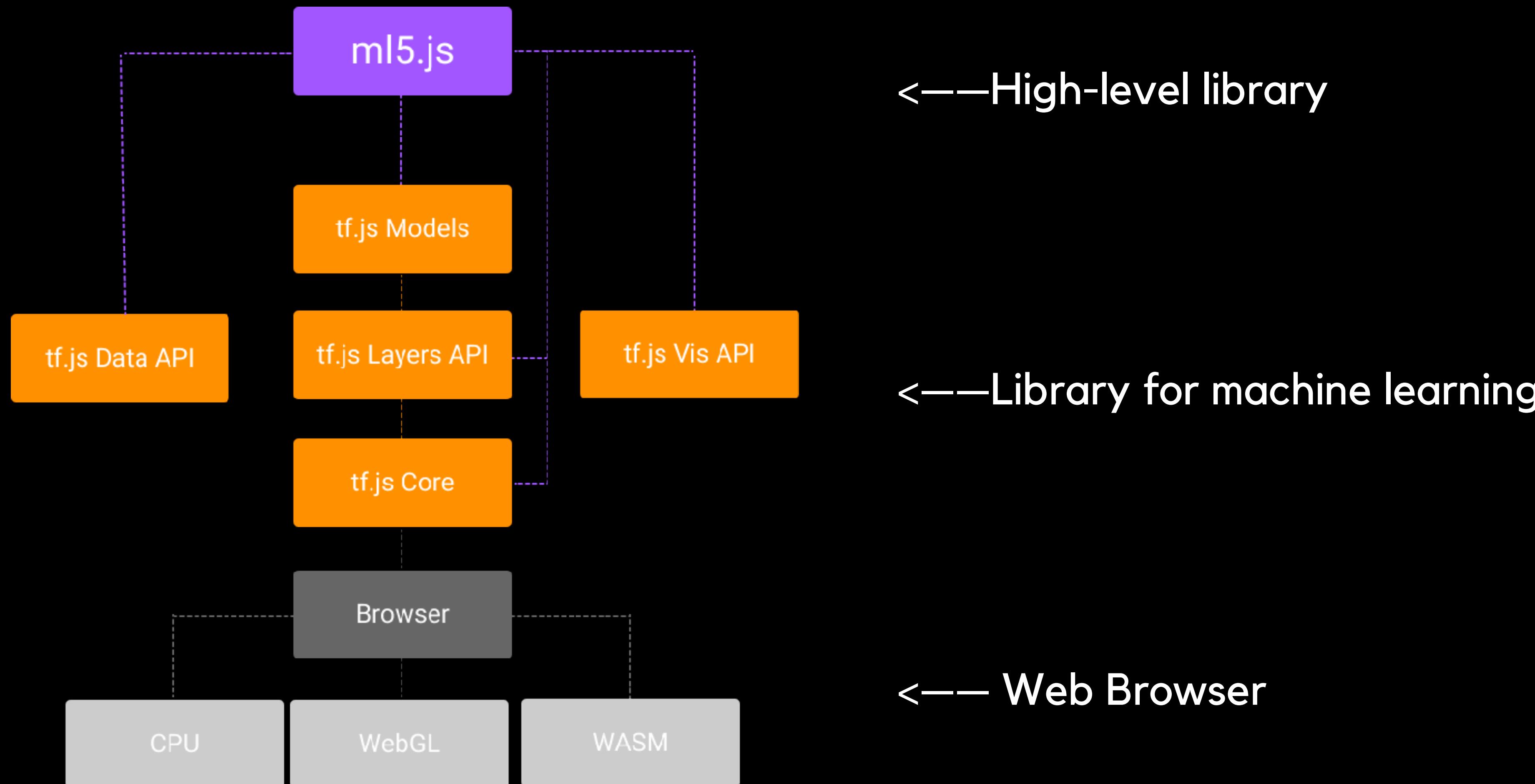


Sentiment









Training

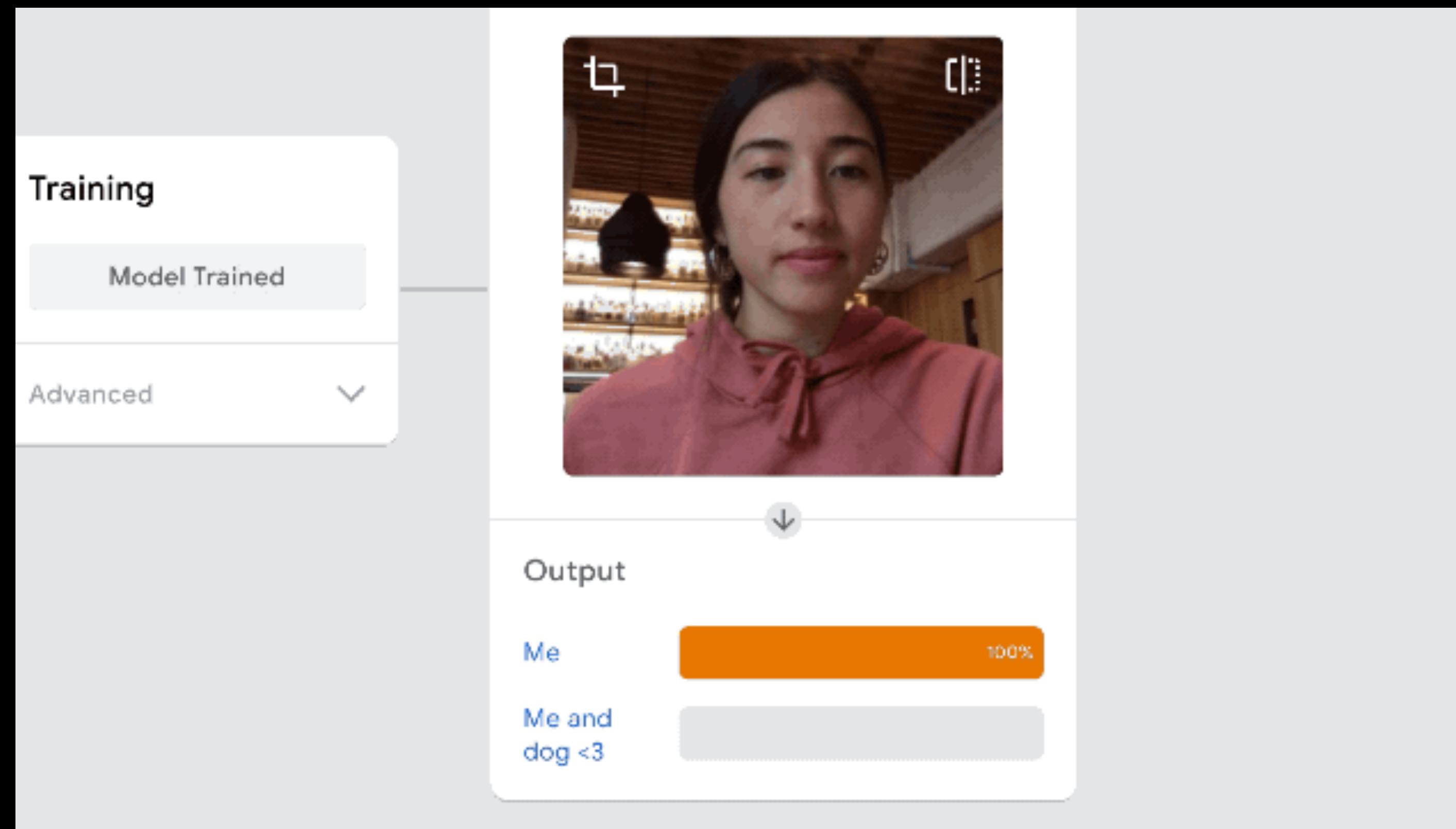
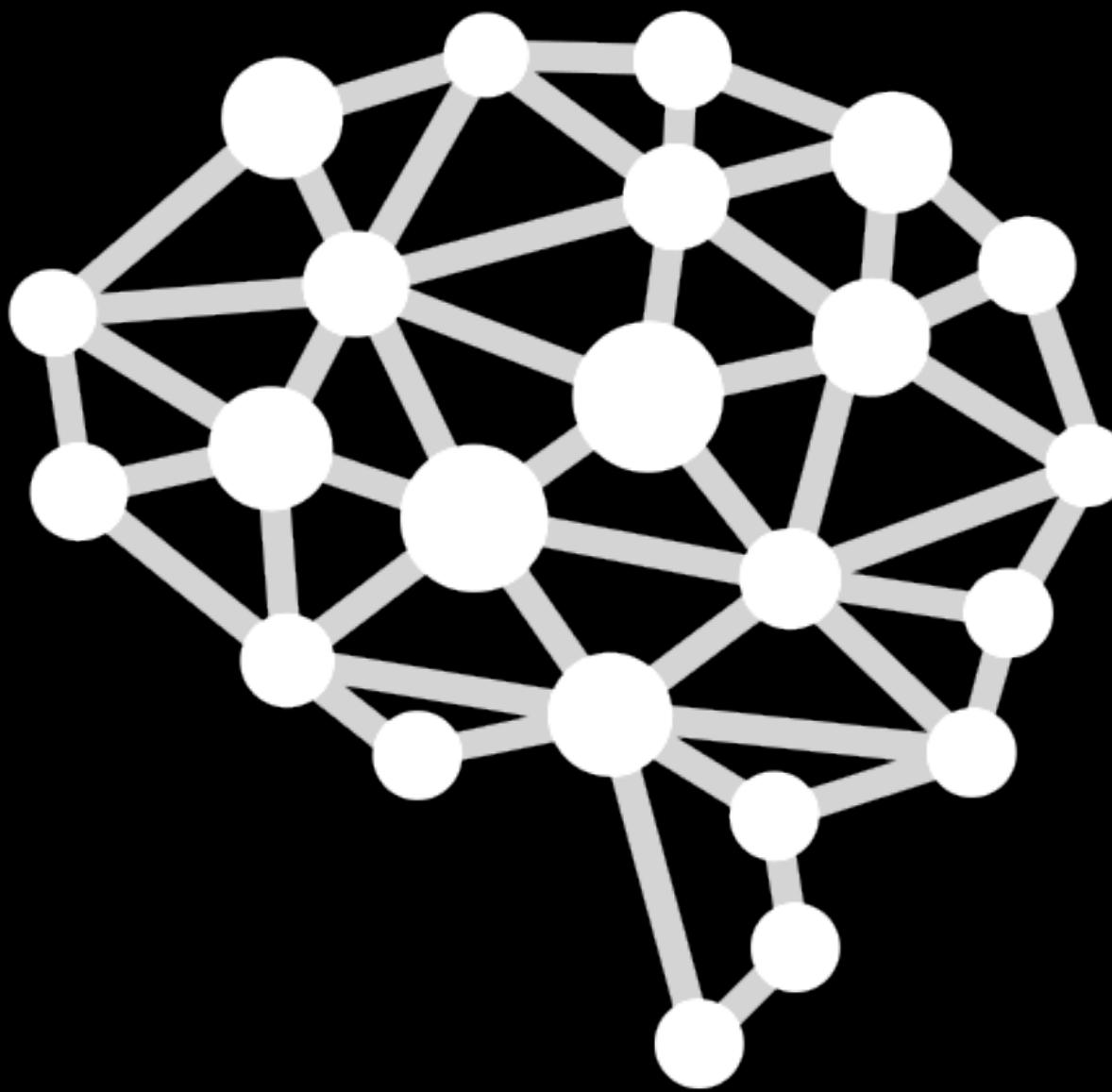


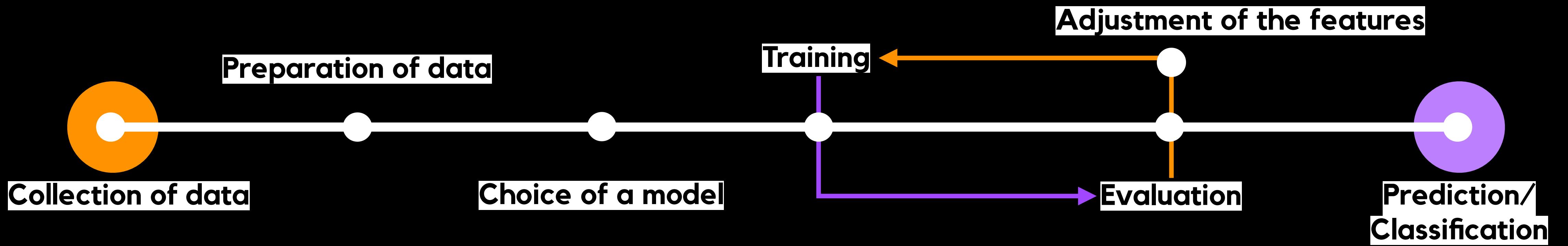
Image Classifier + Teachable Machine

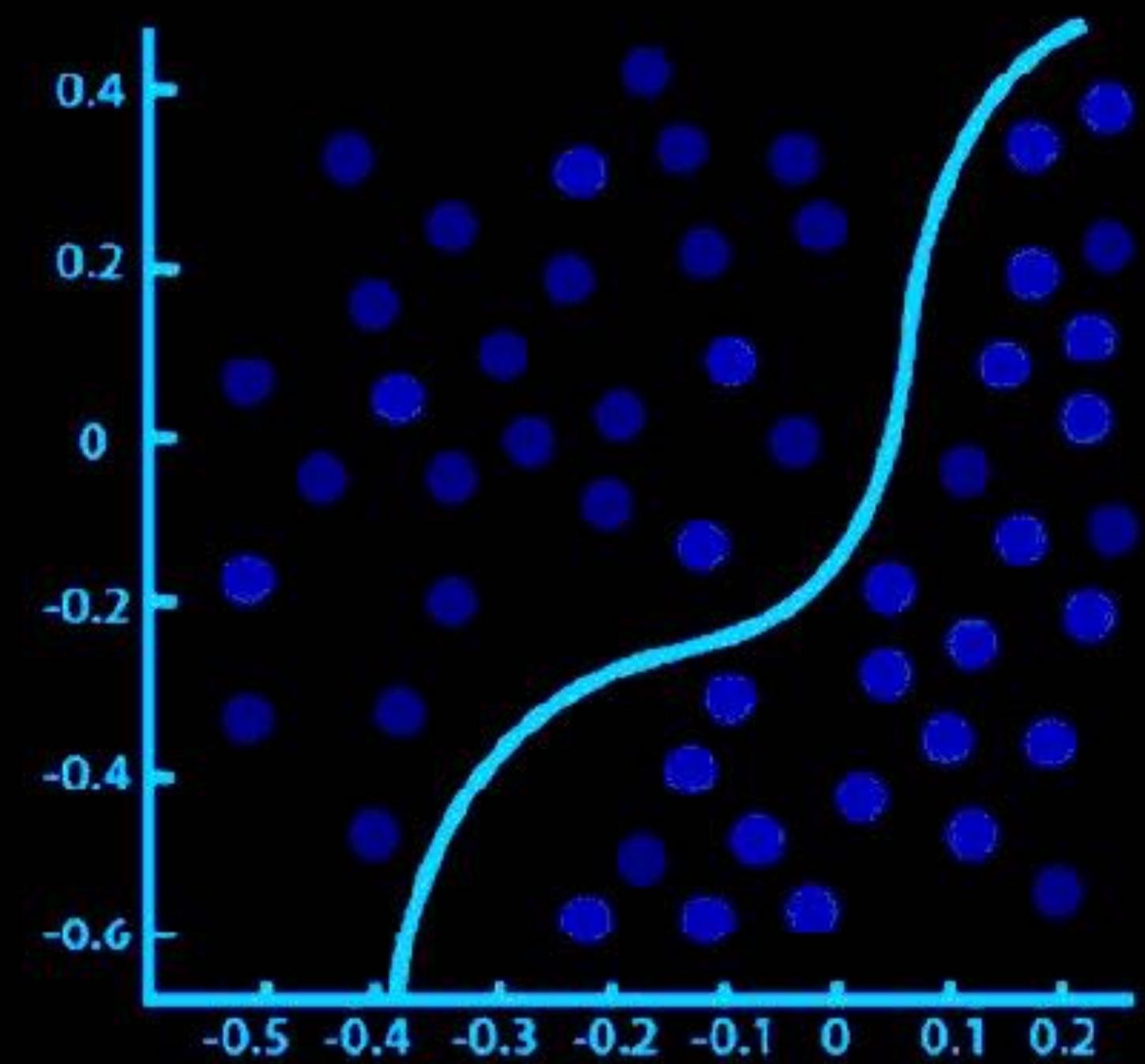
Training



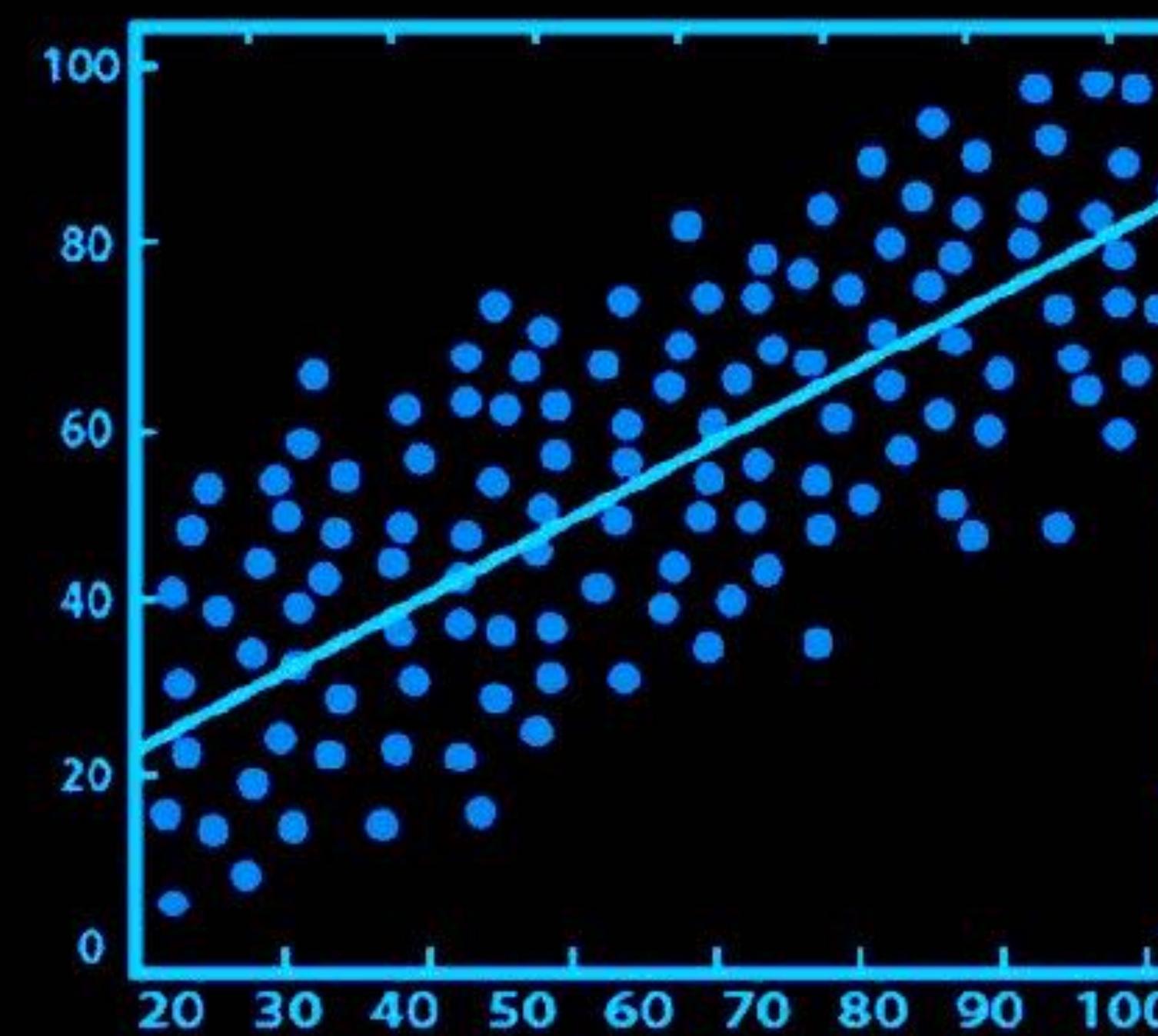
NeuralNetwork

Training cycle





Classification



Regression

Project examples



"Objectifier" Bjorn Karmann



"Recharge" Dries Depoorter



"0,1 Blink" Michal Kohut



“Unlearning language” Lauren McCarthy

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